

The Regional Partnerships Move on to Evaluate Potential Sequestration Sites

Southeast Regional Carbon Sequestration Partnership

Presented by:
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Secretary to the Board
Southern States Energy Board



Presented to:
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Capture & Sequestration
Alexandria, Virginia
May 11, 2006



SECARB Phase II Partners *(in alphabetical order)*

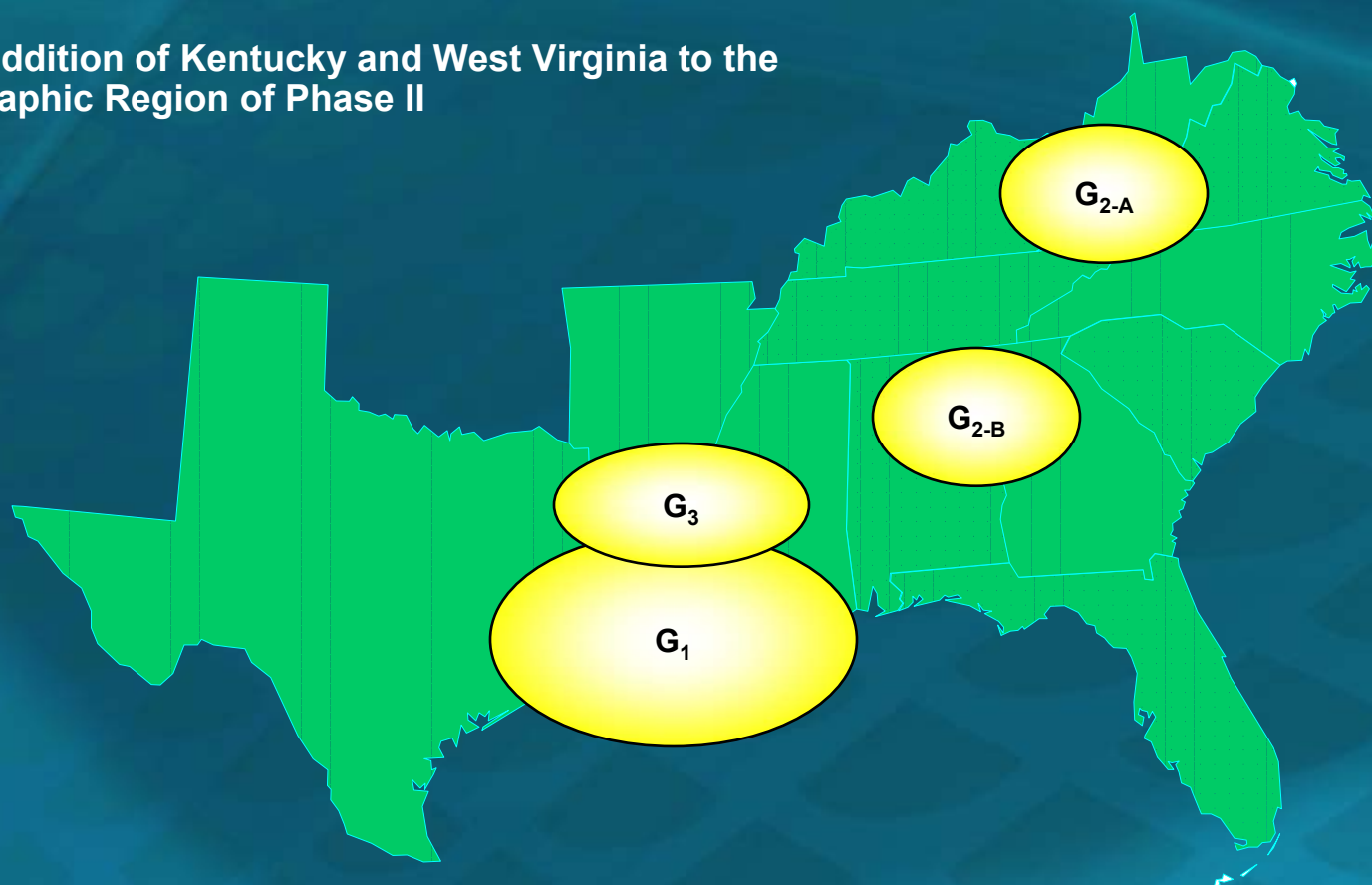
Advanced Resources International
 AGL Resources
 American Electric Power
 Amvest Gas Resources, Inc.
 Applied Geo Technologies
 Arkansas Oil and Gas Commission
 Augusta Systems, Inc.
 BP America, Inc.
 Buchanan Energy Company
 of Virginia, LLC
 CO₂ Capture Project
 CDX Gas, LLC
 Center for Energy and
 Economic Development
 ChevronTexaco Corporation
 Clean Energy Systems, Inc.
 Composite Technology Corporation
 CONSOL, Inc.
 Core Laboratories
 Dart Oil & Gas Corporation
 Denbury
 Dominion Energy
 Dominion Resources
 Duke Power
 Eastern Coal Council
 Edison Electric Institute
 Electric Power Research Institute (EPRI)
 Entergy Services

Equitable Production
 Florida Power & Light Company
 Geological Survey of Alabama
 Geological Survey of Kentucky
 Georgia Environmental
 Facilities Authority
 Georgia Forestry Commission
 Georgia Power Company
 Interstate Oil and Gas
 Compact Commission
 Lawrence Berkeley National Laboratory
 Lawrence Livermore National Laboratory
 Louisiana Department of
 Environmental Quality
 Louisiana Geological Survey
 Marshall Miller & Associates
 Massachusetts Institute of Technology
 McJunkin Appalachian Oilfield Company
 Mississippi Power Company
 Mississippi State University (MSU)
 North American Coal Corporation
 North Carolina State Energy Office
 Nuclear Energy Institute
 Oak Ridge National Laboratory
 Old Dominion Electric Cooperative
 Phillips Group, The
 Pine Mountain Oil & Gas, Inc.
 Praxair

Progress Energy
 RMB Earth Science Consultants, Ltd.
 RMS Strategies
 SCANA Energy
 Schlumberger
 Smith Energy
 South Carolina Dept. of Agriculture
 South Carolina Electric & Gas
 Company
 South Carolina Public Service
 Authority/Santee Cooper
 Southern Company
 Southern Company Services
Southern States Energy Board 
 Susan Rice and Associates, Inc.
 TXU Corporation
 Tampa Electric Company
 Tennessee Valley Authority
 Texas Bureau of Economic Geology
 -Gulf Coast Carbon Center
 United Company, The
 United States Department of
 Energy/National Energy Technology
 Laboratory
 Virginia Polytechnic Institute
 and State University – Virginia Center
 for Coal and Energy Research
 Winrock International

SECARB Phase II Geographic Region & Field Test Site Locations

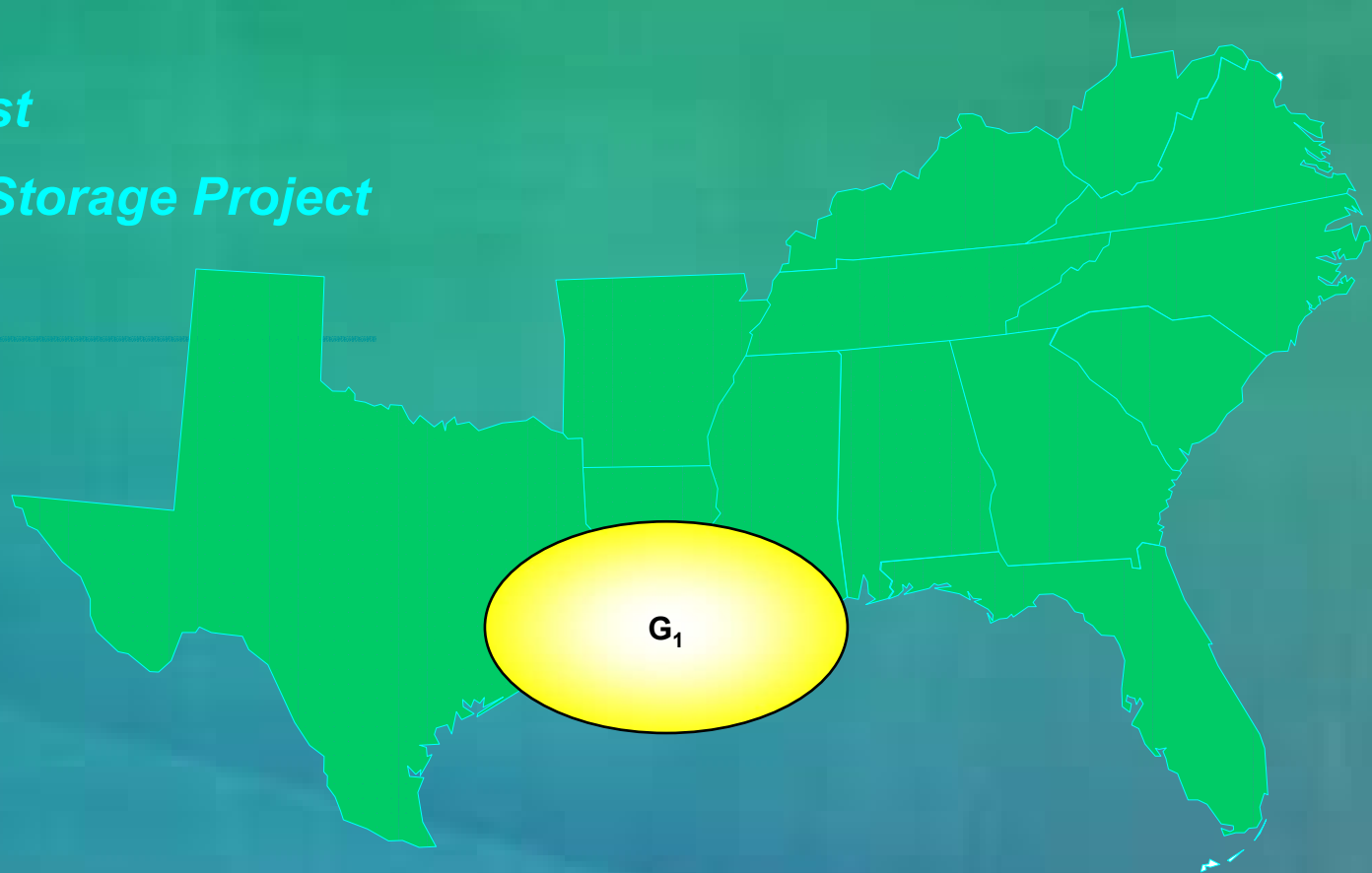
Note addition of Kentucky and West Virginia to the Geographic Region of Phase II



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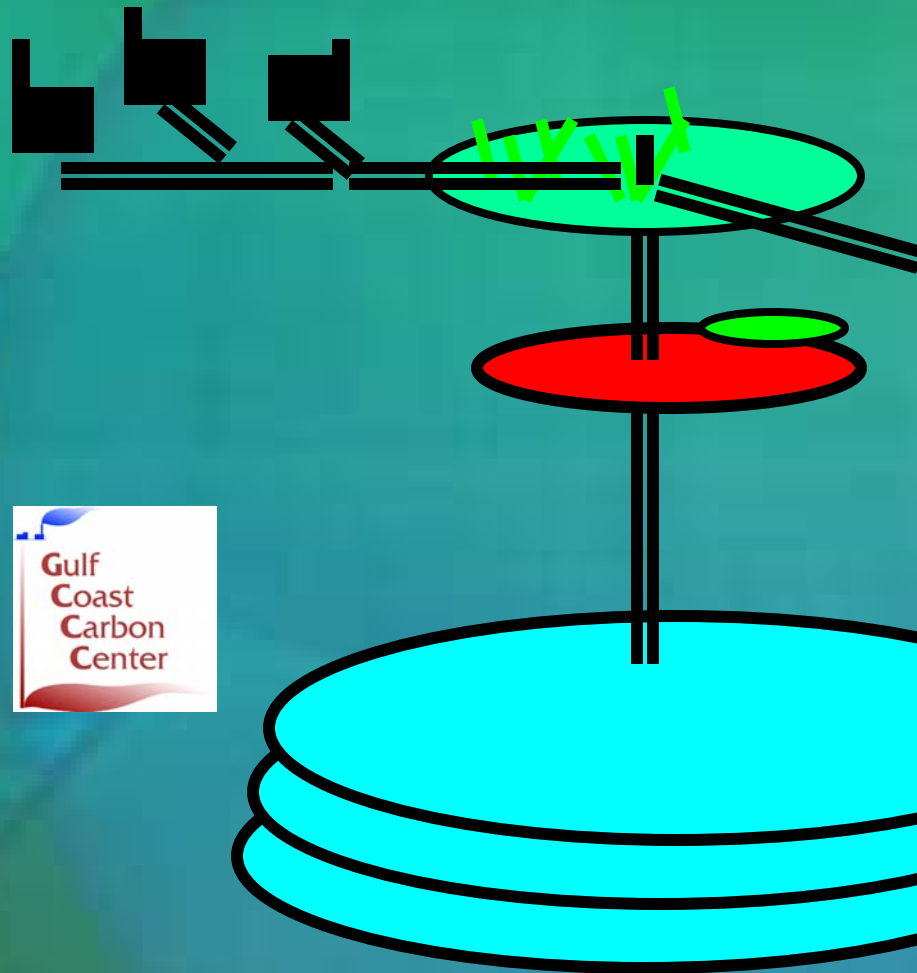
Gulf Coast Stacked Storage Project



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Geologic Storage Evolution in the Gulf Coast



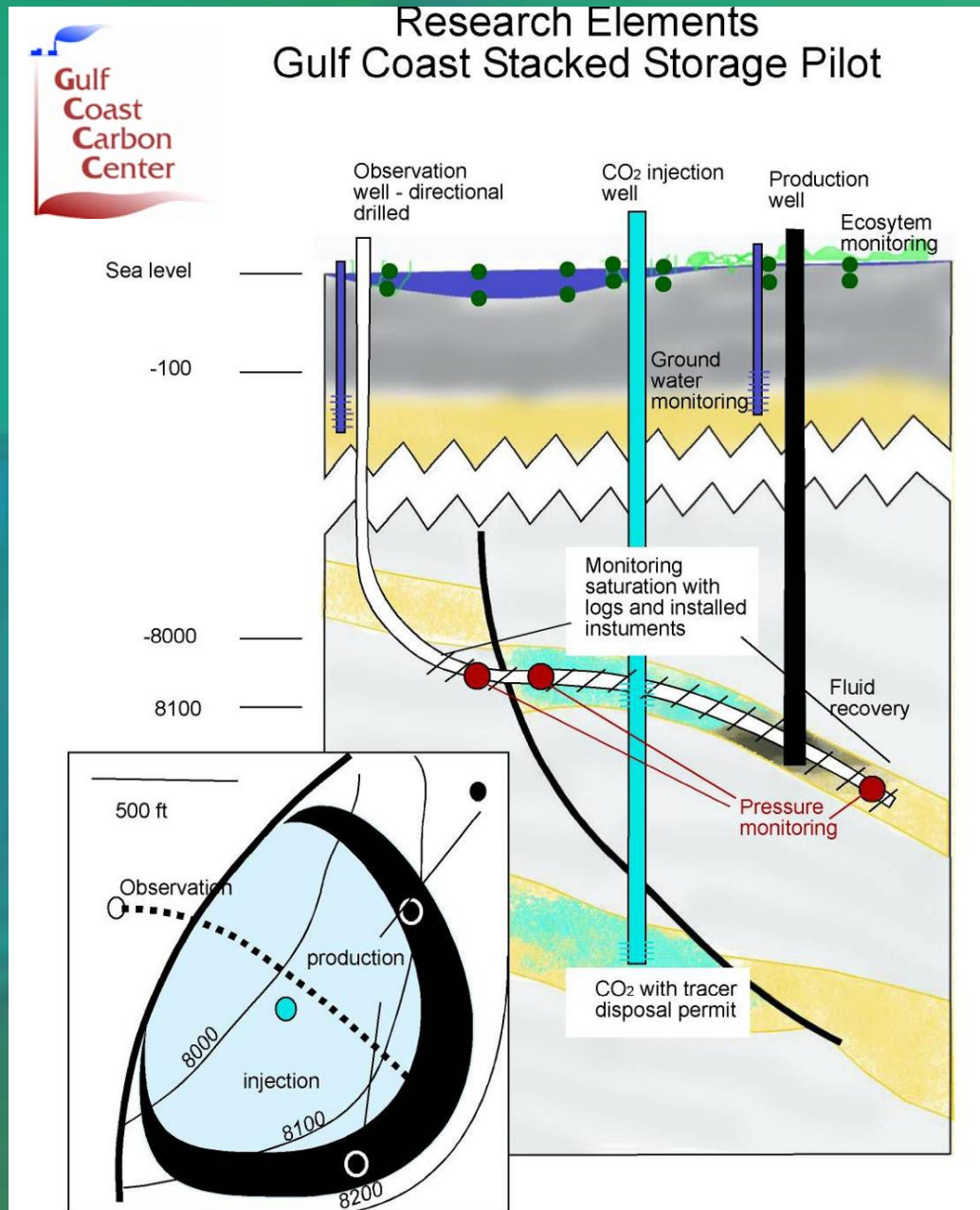
Near-term and long-term sources and near and long-term sinks linked regionally in a pipeline network

Enhanced oil and gas production to offset development cost and speed implementation

Very large volume storage in stacked brine formations beneath reservoir footprints



Stacked Storage Monitoring Elements



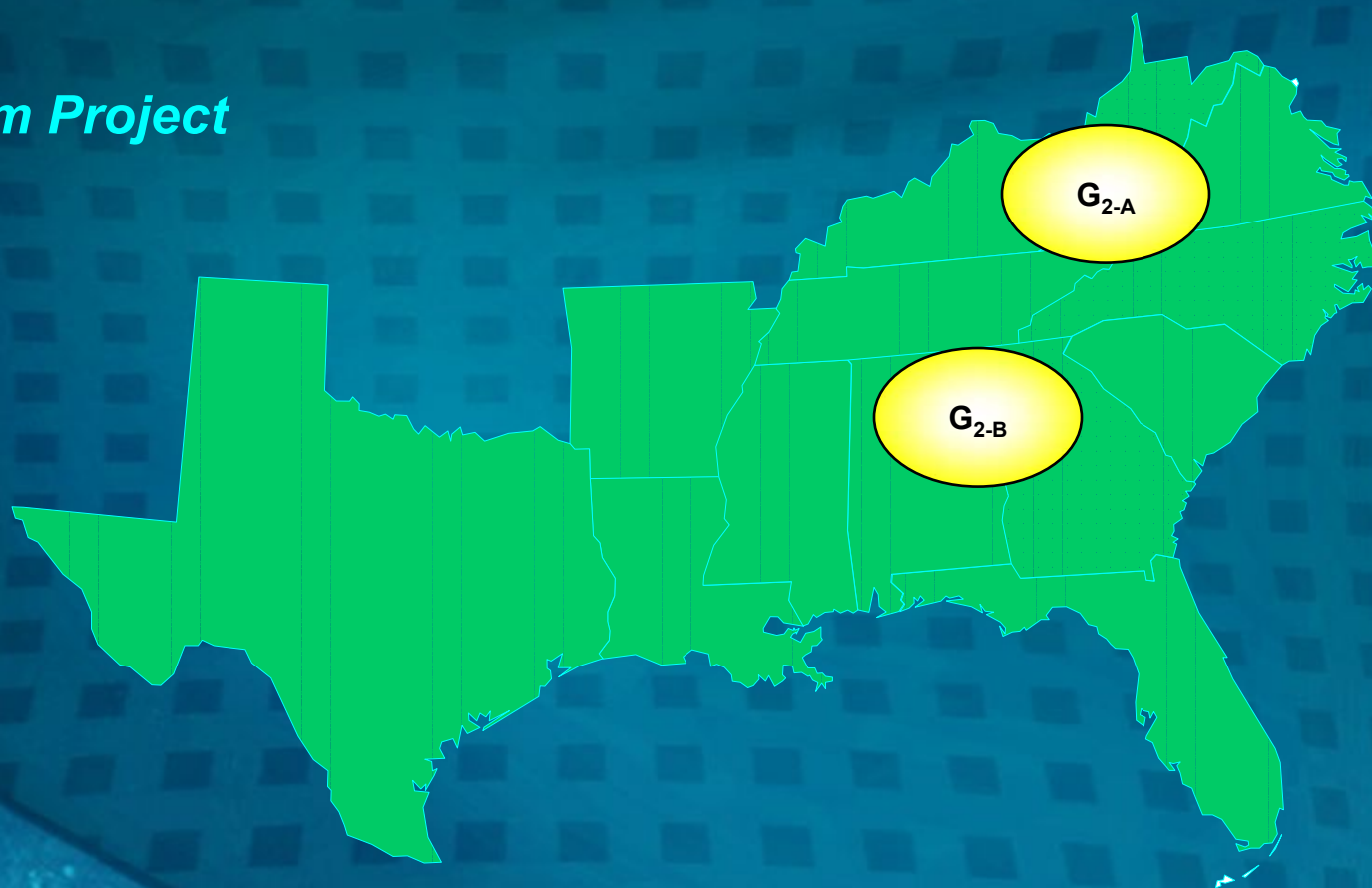
Ecosystem monitoring:
Chemical and biologic change

Ground water monitoring for
geochemical change

Injection horizon: pressure,
temperature, oil and CO₂
saturation during and post-
injection, instrumented slant hole

Characterization of deeper
horizon in preparation for eventual
disposal

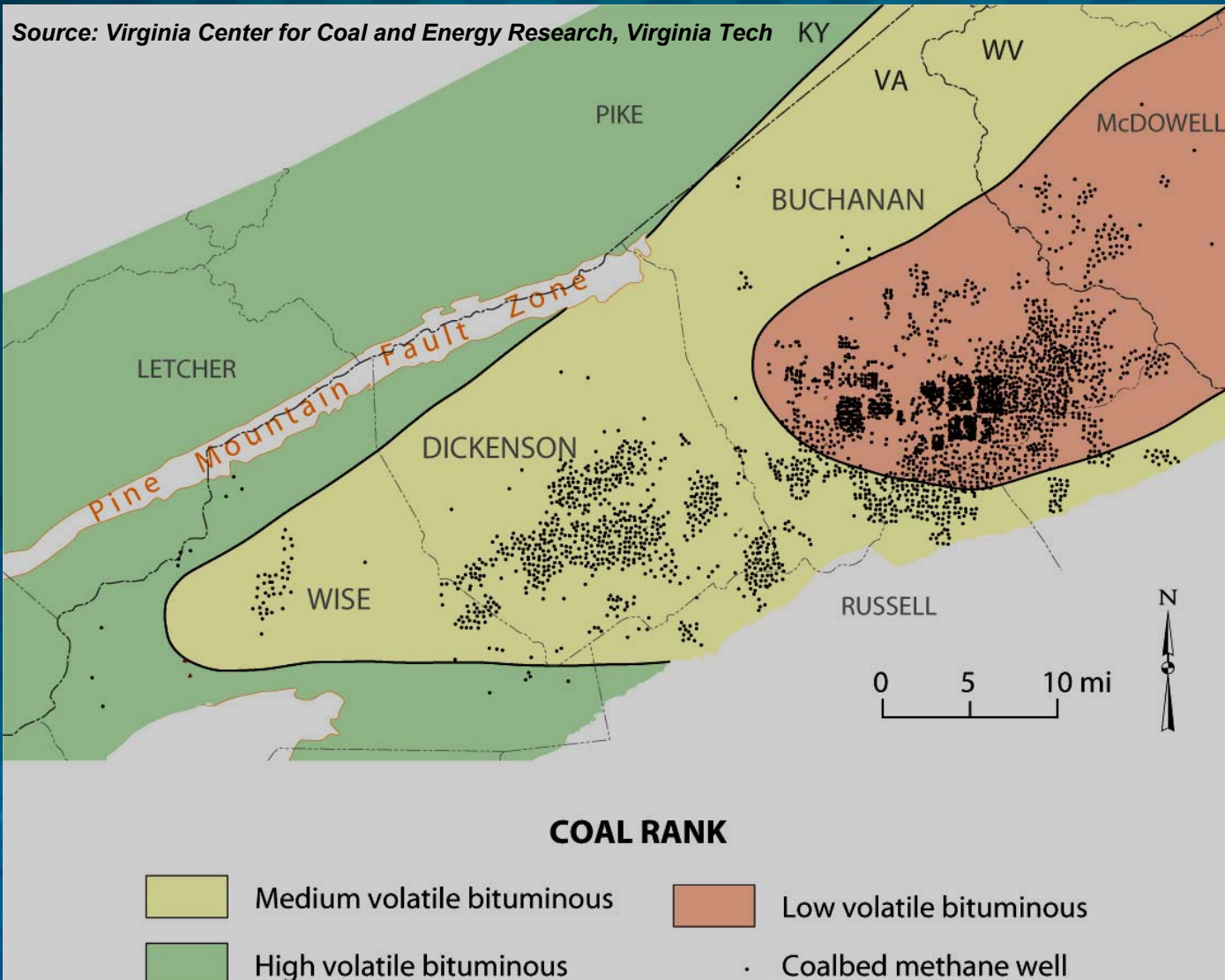
Coal Seam Project



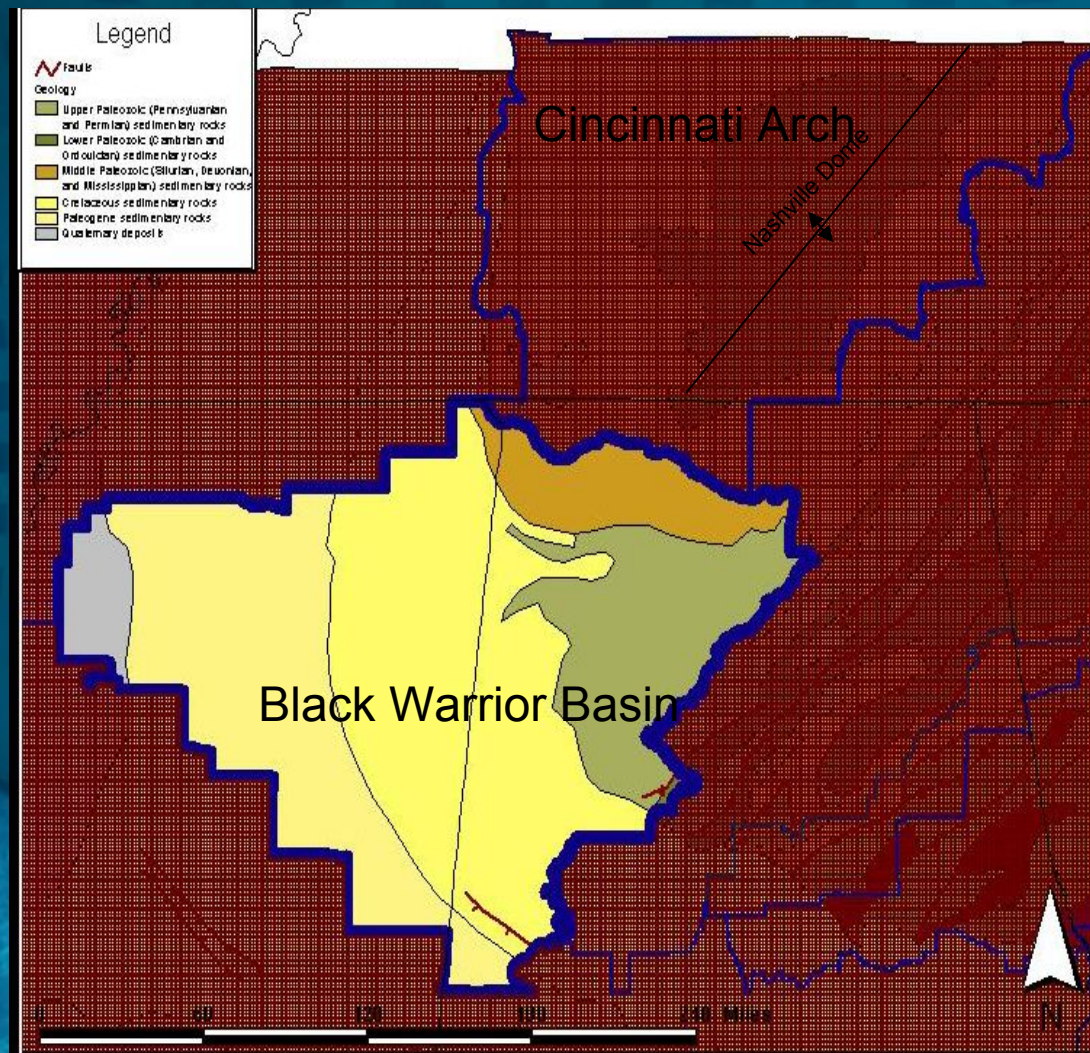
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Virginia CBM Development



Black Warrior Basin - Alabama



Source: Applied Resources International

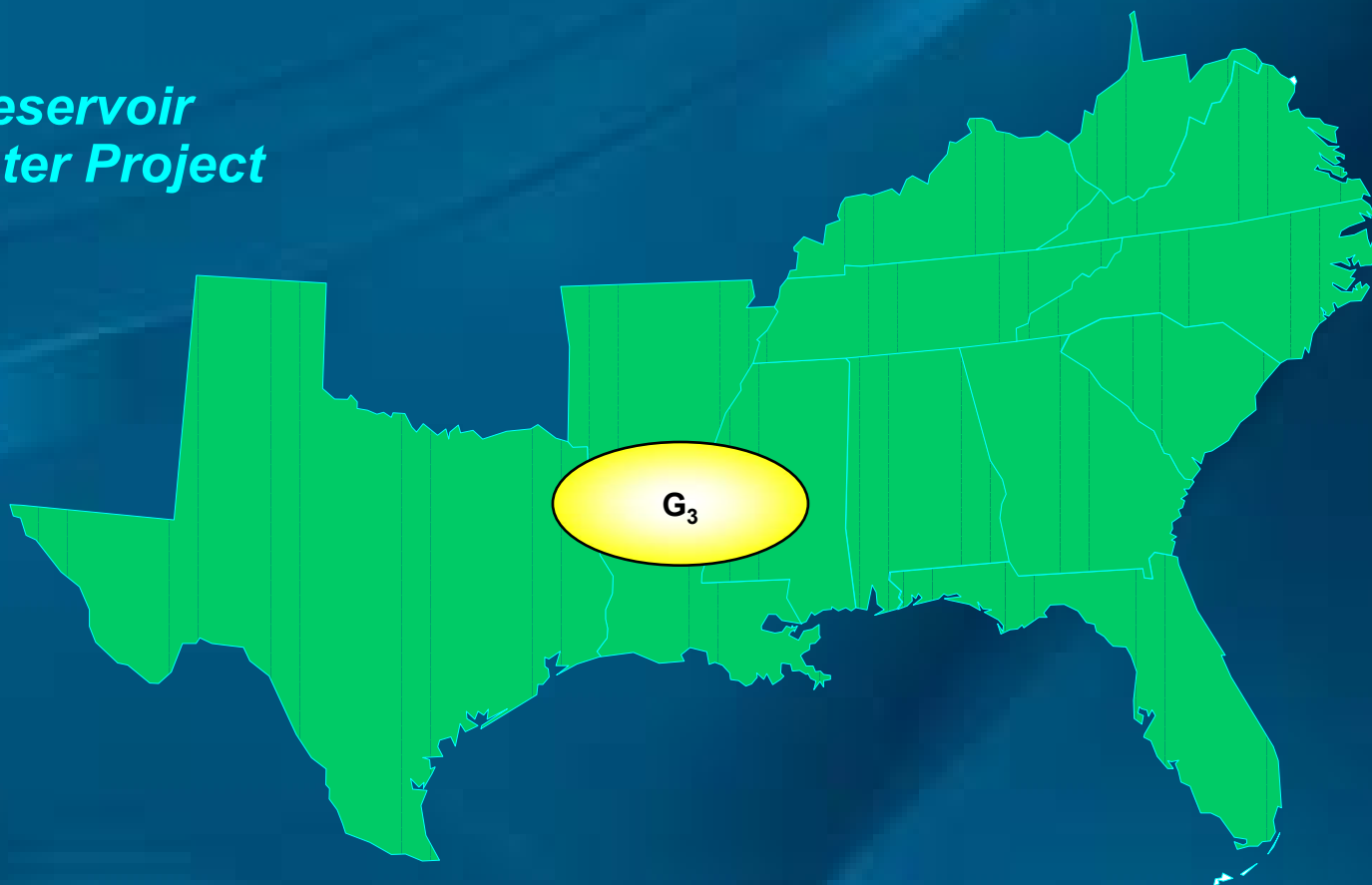
Blue Creek Field



Image © 2005 DigitalGlobe

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Saline Reservoir Test Center Project



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Site Selection Through EPRI CO₂ Test Centers Project

- ◆ **Build and operate 2-3 Test Centers**

- ◆ Capture and store CO₂ at 10 MW scale
- ◆ Real operating environments
- ◆ Monitor 1 million tons CO₂ over a 10-year period

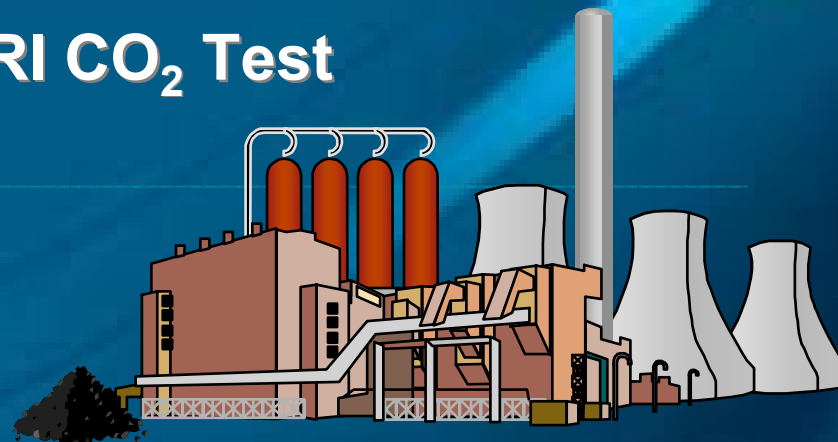
- ◆ **First site likely an existing PC-fired unit**

- ◆ Results applicable to new PC plants

- ◆ **Single well disposal/storage design for initial pilot**

- ◆ **Goals include:**

- ◆ Accelerate development of cost-effective options
- ◆ Evaluate technical and environmental issues at a reasonable size
- ◆ Collect long-term data



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Work Plan

- Task 1. *Project Definition.*** Build initial geologic and reservoir model and conduct public outreach.
- Task 2. *Project Design.*** Procure CO₂ supply (3,000 tons), define MMV protocols and complete regulatory compliance.
- Task 3. *Project Implementation.*** Drill, log and test slim-hole reservoir characterization well, gather baseline data and prepare field test site. Drill, complete and test CO₂ injection well.
- Task 4. *Project Operations.*** Inject CO₂ (for 30 days), complete MMV protocols and modify reservoir model.
- Task 5. *Project Completion, Post Appraisal and Report.*** Extrapolate field test for injectivity, storage capacity and costs of geologic CO₂ storage in SECARB region. Prepare MMV protocols chapter and final reports.



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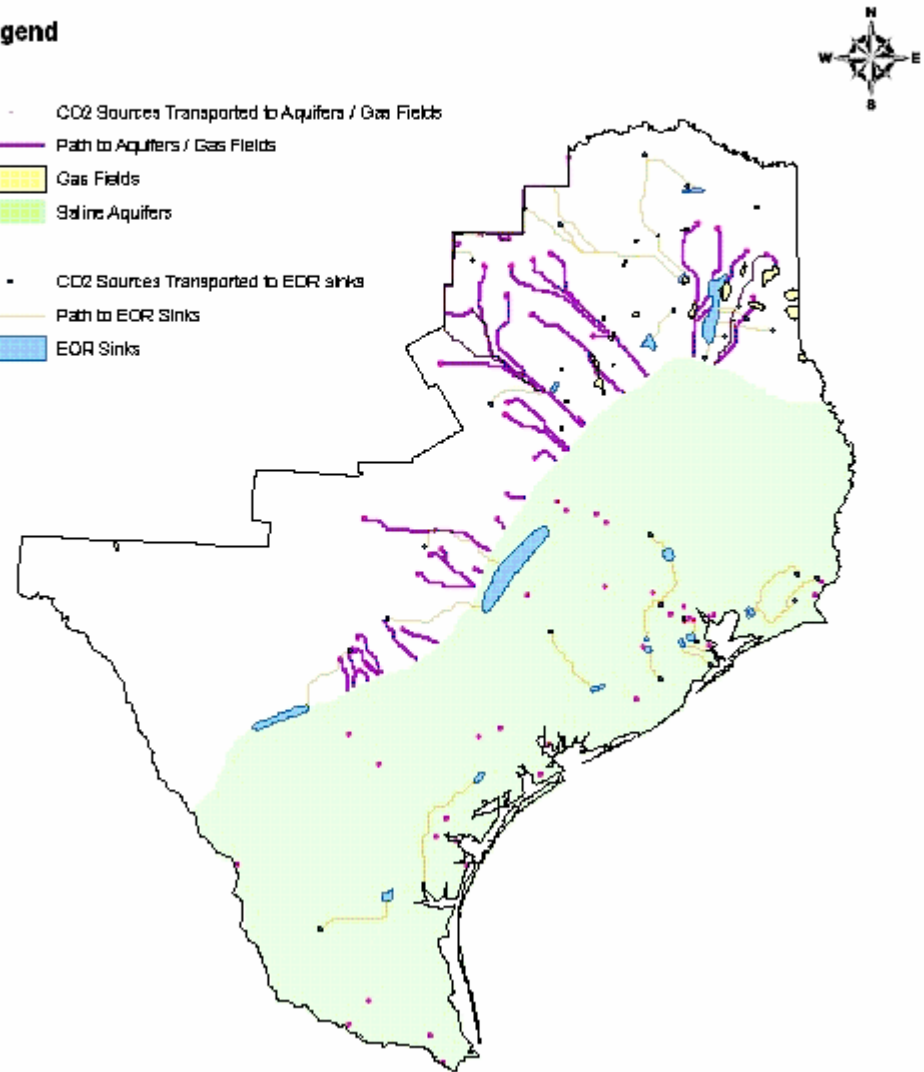
Sources & Sinks Matching

Final Results

CO2 Sources and Sinks Matching via Least-cost Path (TX)

Legend

- CO2 Sources Transported to Aquifers / Gas Fields
- Path to Aquifers / Gas Fields
- Gas Fields
- Saline Aquifers
- CO2 Sources Transported to EOR sinks
- Path to EOR Sinks
- EOR Sinks

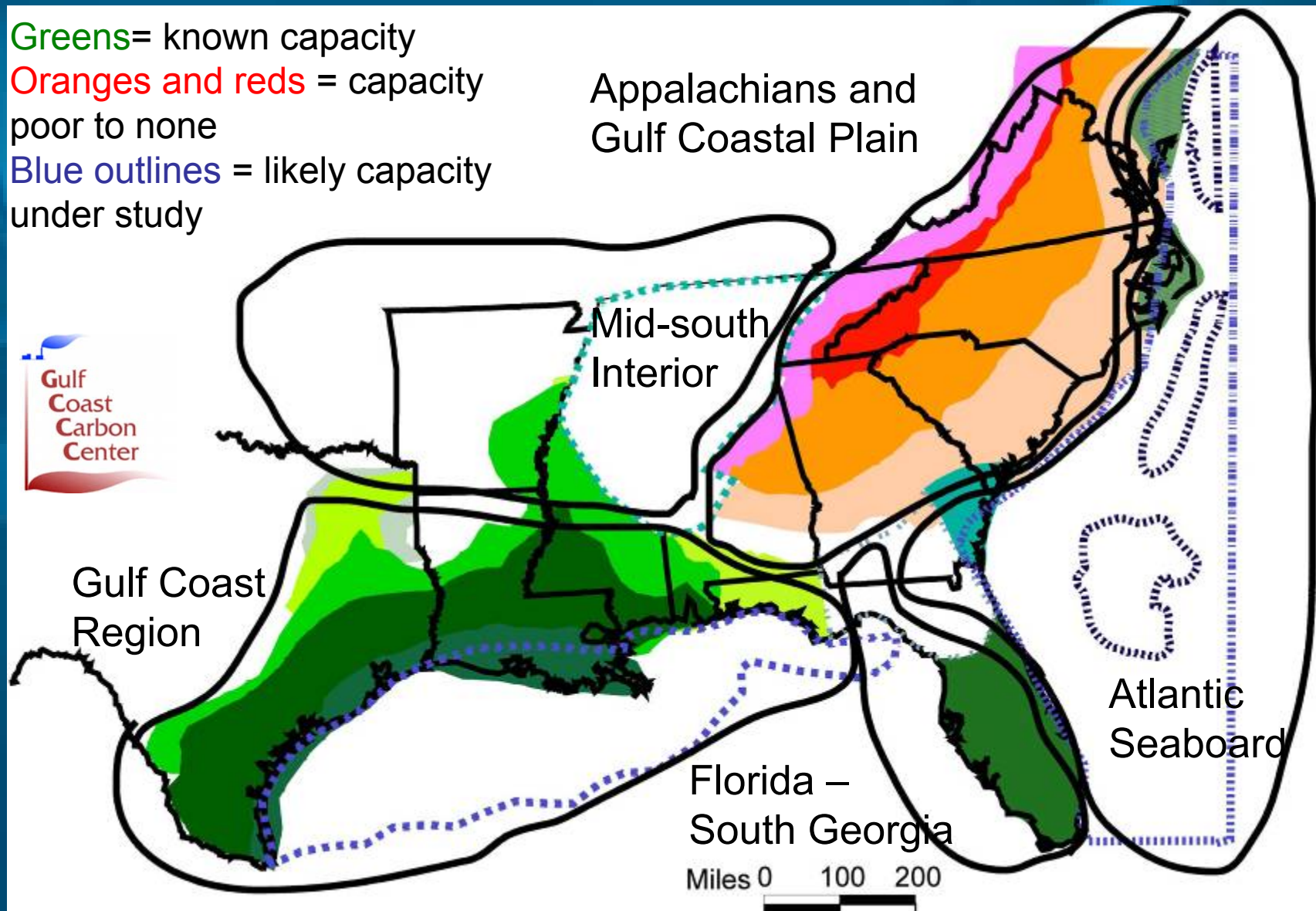


Source: Massachusetts Institute of Technology

Greens = known capacity

Oranges and reds = capacity poor to none

Blue outlines = likely capacity under study



Measuring, Monitoring and Verification (MMV)

Principle and Merits of Cavity Ringdown Spectroscopy

- ◆ Ringdown does not measure light intensity
- ◆ Ringdown measures changes of time constants resulting from any interaction occurred in the ringdown *cavity*
- ◆ Ultra Sensitive (ppt to ppm levels)
- ◆ Highly Selective (absorption, fingerprints)
- ◆ Fast Response (<1 second)
- ◆ Robust (in high temperature and vibration)
- ◆ Calibration Free (absolute measurements)



SECARB Industry Briefing

- ◆ January 18-19, 2006 in Atlanta, Georgia
- ◆ Two-day program with overview of Phase I accomplishments and Phase II goals
- ◆ Expert panel devoted to emerging MMV technologies
- ◆ Industry partners and others (more than 70 participants)
 - ◆ Technical experts from the region
 - ◆ Technology providers
 - ◆ Coal companies
 - ◆ DOE National Laboratories
 - ◆ Universities
- ◆ Instrumental in expanding support for the Partnership



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Carbon Sequestration Leadership Forum International Intellectual Property Issues*

- ◆ Customization of intellectual property protection to meet specific needs
- ◆ Protection of intellectual property rights
- ◆ Prevent design around
- ◆ Best suited property rights for protection
- ◆ International cooperation to share and protect technology
- ◆ Solving problems with intellectual property barriers

Goals:

- ◆ Provide introduction to intellectual property issues
- ◆ Facilitate discussion on issues, problems and solutions

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